
Chapter 7 — Acceptance testing

Verifying ISDN BRI operation

After ISDN BRI equipment has been installed and configured, you can visually inspect ISDN BRI cards to make sure that they are operating correctly by observing their LEDs:

- Check the red Dis LED located on the MISP faceplate. If the Dis LED on an MISP is lit, the MISP is disabled or faulty. If it is extinguished, the MISP is enabled and operating. To enable the MISP or to correct a problem, go to *MISP fault isolation and correction* in the *Service changes and maintenance* section of this guide.
- Check the red LED located on the SILC and UILC faceplates. If the red LED on an SILC or a UILC is extinguished, that SILC or UILC is enabled and operating correctly. If the red LED is lit, that SILC or UILC is manually disabled or faulty. To enable an SILC or a UILC or to correct a problem, go to *SILC or UILC fault isolation and correction* in the *Service changes and maintenance* section of this guide.

If all indicator LEDs on ISDN BRI equipment are extinguished (with the exception of the CC LED on a MISP), the equipment is functional and you may proceed with setting up the terminals you wish to use for this test.

Setting up ISDN BRI test terminals and trunks

Designating ISDN BRI test terminals

To conduct acceptance testing, you must have a setup that can verify basic ISDN BRI functions and features. Figure 53 shows an example of the ISDN BRI terminal arrangement. You may wish to establish a different test setup, which may be determined by the type of terminals implemented in a specific customer configuration. You may want to set up communication between ISDN BRI and non-ISDN terminals.

Refer to the *ISDN BRI line and packet data implementation* chapter of this guide for ISDN BRI terminal installation instructions:

To perform acceptance testing using the configuration shown in Figure 53:

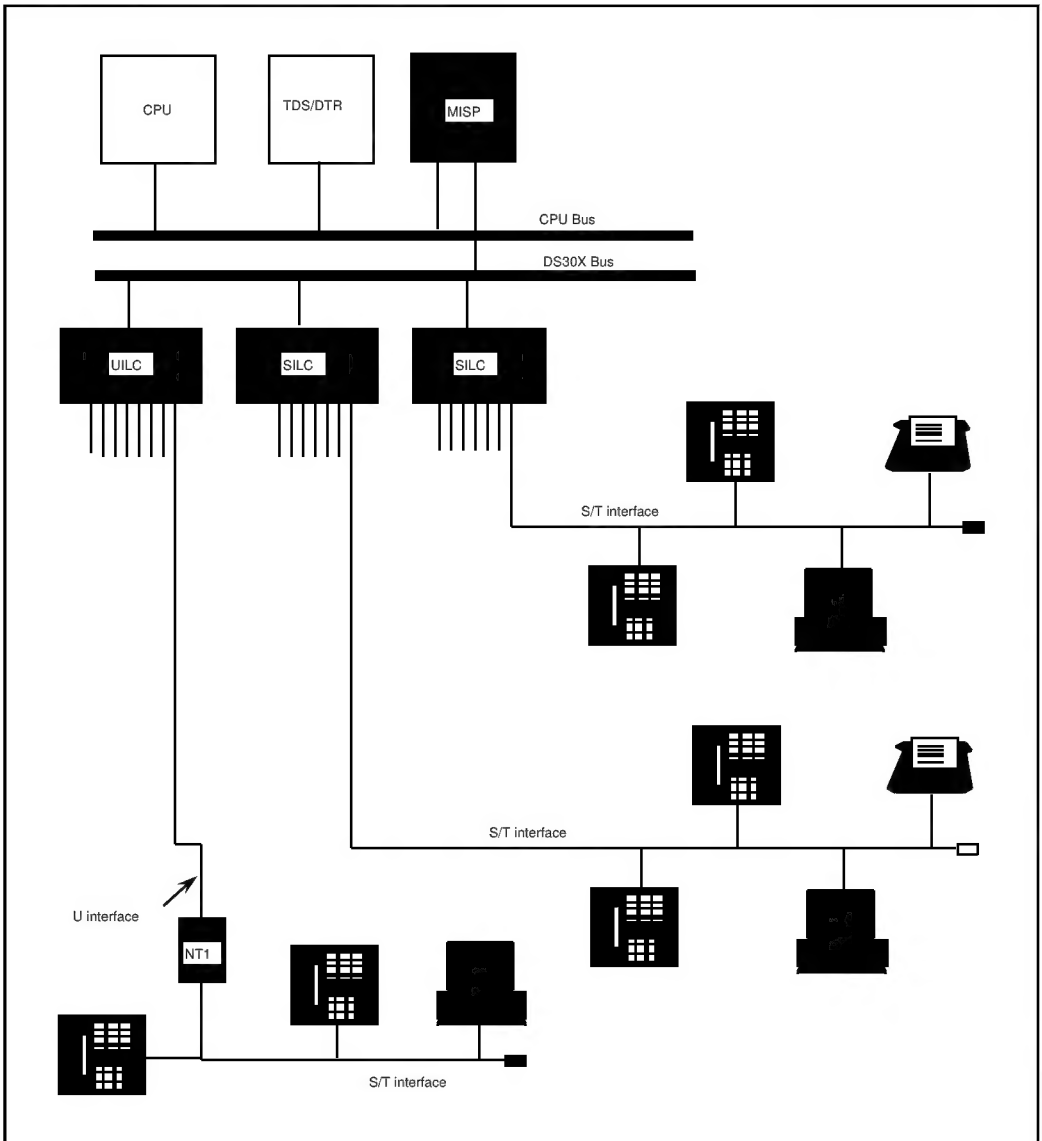
- select three digital subscriber loops (DSLs), two connected to different SILCs and one to a UILC.
- equip each SILC DSL with two voice, one circuit-switched data, and one low speed packet data ISDN BRI terminals.

Note: Packet data testing can be conducted only if the packet handler is installed as part of the customer configuration. If packet handler is not part of the configuration, do not equip the DSLs with packet data terminals and skip all the packet data tests specified in this section.

- equip the UILC DSL with a network terminator (NT1) and connect the two voice and one circuit-switched data ISDN BRI terminal to the S/T interface on the NT1.
- configure the DSLs to support these ISDN BRI terminals and initialize the terminals as described in the *ISDN BRI line and packet data implementation* chapter of this guide.

After you have completed the setup to perform acceptance testing, you can proceed with the tests.

Figure 53
ISDN BRI acceptance testing setup



Setting up ISDN BRI trunking - Local Exchange connectivity

The ISDN BRI Local Exchange DSL is connected to a Network Termination (NT1) device, which is physically located on the same premises as the Option 11. The NT1 device connects to the Local Exchange that supports Numeris or ITR6 protocol via a U interface. The distance limitation of the NT1 from the Local Exchange depends on the distance supported by the Local Exchange. Refer to the section titled “ISDN *BRI local exchange/DID connectivity*” in Chapter 6 for more information.

After you have completed the setup to perform acceptance testing, you can proceed with the test described in this chapter.

Setting up ISDN BRI trunking - TIE trunk connectivity

A Meridian Customer Defined Networking (MCDN) TIE trunk connection may be implemented by connecting two Meridian 1s to the ISDN BRI leased line through the local exchange via two SILC cards. The S/T interface is connected to the local exchange using the NT1. Refer to the section titled “ISDN *BRI TIE trunk connectivity*” in Chapter 6 for more information.

After you have completed the setup to perform acceptance testing, you can proceed with the test described in this chapter.

Testing ISDN BRI functions

The following describes some ISDN BRI tests used to verify the operation of ISDN BRI features. The tests include basic call connections, voice and data transmission, and verification of features using ISDN BRI terminals.

The tests are divided into:

- voice calls
- circuit-switched data calls
- B-channel and D-channel packet data calls

Voice calls

A voice call can be established between two voice terminals across a network (ISDN or non-ISDN), between two terminals on the same Option 11, and between two terminals on the same DSL.

Acceptance testing of ISDN BRI voice calls is conducted when testing the following basic system features supported by ISDN BRI terminals:

- Call hold/call retrieve
- Call waiting
- Call forward no answer
- Call forward busy
- Calling line identification presentation and restriction
- Hunting
- Message waiting (audible)

Call hold (not applicable to 1TR6)

Call hold is used to place an active call on hold in order to answer an incoming call or place an outgoing call. After releasing an incoming or an outgoing call, you can retrieve the call on hold.

To perform a call hold test:

- 1 From a ISDN BRI terminal, dial a BRI or a non-ISDN terminal and establish an active call connection.**
- 2 Verify that voice transmission is established by talking with the person at the other terminal.**
- 3 Press the Hold key to place the active call on hold.**

Note: To find out how to use the feature keys on different ISDN BRI terminals, consult the user manual supplied with the terminal.

- 4 Place an outgoing call by dialing an idle ISDN BRI or a non-ISDN terminal.**
- 5 Complete this outgoing call and hang up.**
- 6 Have another ISDN BRI or non-ISDN terminal call you while the first call is still on hold.**
- 7 Answer the incoming call and place it on hold.**
- 8 Retrieve the call first held.**
- 9 Complete the call and hang up.**
- 10 Retrieve the second call on hold.**
- 11 Complete the call and hang up.**

Repeat this test for terminals connected to the same DSL, different DSLs on the same card, different DSLs on cards associated with different MISPs, and between ISDN BRI and non-ISDN terminals.

ISDN BRI Call waiting

Call waiting informs a ISDN BRI terminal user engaged in an active call that a call is waiting to be answered. A call setup message is sent to a DSL when both B-channels are busy and an incoming call is in progress. This causes the call waiting lamp on the called ISDN BRI terminal to flash. To accept the new call, the user must place the currently active call on hold or release the call.

Call Waiting is activated only if hunting is not enabled. The incoming call may originate from an ISDN BRI or a non-BRI terminal.

To perform a call waiting test:

- 1 Set the FEAT parameter to HTD to disable hunting when configuring the TSP for the two voice ISDN BRI terminal DNs on one of the DSLs by using Service Change BRI Program LD 27.**
- 2 From a ISDN BRI terminal with disabled hunting, dial another ISDN BRI terminal and establish an active call connection.**
- 3 From the second ISDN BRI terminal with disabled hunting, dial another ISDN BRI terminal and establish another active call connection.**

Both B-channels on the DSL are now busy.

- 4 Place an incoming call to one of the busy ISDN BRI terminals with disabled hunting.**
- 5 Observe the button light on the called ISDN BRI terminal. The lamp should flash and the warning tone should sound indicating that a call is waiting.**
- 6 Place the active call on hold and answer the call that is waiting.**
- 7 Complete the incoming call and hang up.**
- 8 Retrieve the call on hold.**
- 9 Complete the call and hang up.**

Call forward no answer

Call forward no answer and second level forward no answer forwards an unanswered call to a call forward no answer DN after a predetermined number of rings. This feature is enabled at the TSP level when defining the BRI DN. Both the external and internal call forward no answer are configured at the DSL level using Service Change BRI Program LD 27. The call can be specified to be forwarded to the attendant, to an assigned hunting DN, or to a flexible call forward no answer DN by using Customer Data Block Program LD 15.

When a call originated by a ISDN BRI terminal is forwarded to a predetermined DN specified in Customer Data Block Program LD 15, the display on that ISDN BRI terminal is not updated to indicate a call modification.

To perform a call forward no answer test:

1 Set the FEAT parameter to FNA and SFA to enable call forward no answer and second level forward no answer.

These parameters are specified when configuring the TSP for one of the two voice ISDN BRI terminal DNs using Service Change BRI Program LD 27. Refer to the *ISDN BRI line implementation* section of this guide in *TSP configuration procedures*.

2 Specify the attendant as the forwarding DN using Customer Data Block Program LD 15.

At the FNAL prompt, enter **ATT** to specify forward to attendant. Refer to LD 15 in *X11 software guide* for a detailed description of the program.

3 From a ISDN BRI terminal, place a call to the ISDN BRI terminal with the enabled call forward no answer feature and the specified call forward to attendant.

4 Do not answer the call.

After a predetermined number of rings, the call will be forwarded to the attendant.

5 Verify that the call was forwarded to the attendant by answering the call at the attendant console.

The attendant console will display the call originating identification number and the notification of call redirection.

6 Hang up at the call-originating ISDN BRI terminal to release the call connection.

The display on this terminal will not be updated to indicate that the original call has been modified and forwarded to attendant.

Call forward busy

This feature automatically routes your incoming calls to the attendant console when your telephone is busy.

To perform a call forward busy test:

1 Set the MCAL prompt (maximum calls allowed) for the DSL to 2.

2 Set the FEAT parameter for the TSP with the following class of service:

CFTD HTD FBA

3 Place two calls on this DSL.

4 Place an incoming DID call to this DSL.

The incoming call should be routed to the attendant.

Calling line identification presentation and restriction

This feature allows a calling party number, also known as calling line identification, to be shown on a called party ISDN BRI terminal display. Parameters that specify this feature are set when configuring the TSP for the ISDN BRI terminal DN by using Service Change BRI Program LD 27. Refer to the *ISDN BRI line and packet data implementation* chapter of this guide in *TSP configuration procedures*.

This feature gives the calling and the called parties the option of displaying the calling line identification as follows:

- The called party ISDN BRI terminal must have the calling line presentation (CLIP) parameter value set to YES to accept the calling line identification and show it on its display.

- The calling party ISDN BRI terminal must have the presentation (PRES) key enabled, which corresponds to PRES parameter set to YES, to allow the calling line identification number to be sent to the called terminal. If the PRES key on the terminal is disabled, which corresponds to PRES parameter set to NO, the calling line identification will not be sent to the called party terminal. The PRES key on the terminal overrides the PRES parameter value entered in the TSP data block when configuring the TSP in the *ISDN BRI line and packet data implementation* chapter of this guide *TSP configuration procedure*.

To perform a calling line identification test:

- 1 Configure both the calling and the called party ISDN BRI terminal DN with CLIP = YES and PRES = YES.**
- 2 Place a call from one terminal to the other and observe the display on the called party ISDN BRI terminal.**

The calling line identification should be displayed during ringing and for the duration of the call.

- 3 Release the call at the called or calling party terminal.**
- 4 Set PRES = NO for the calling party ISDN BRI terminal and place a call to another ISDN BRI terminal.**
- 5 Observe the called party ISDN BRI terminal display.**

It should not display the calling line identification of the calling terminal.

- 6 Release the call connection.**

Hunting

Hunting allows calls that encounter a busy condition at the original call destination to be automatically routed to a different destination in a hunt chain. Hunting continues along a predetermined sequence of DN's in a hunting group until an idle ISDN BRI or non-ISDN terminal DN is found to answer the call or until the maximum number of hunt steps is exhausted. The hunting DN's are defined in the DSL by using Service Change Program LD 27. Refer to the *ISDN BRI line and packet data implementation* chapter of this guide in *DSL configuration procedures*.

Special hunting for BRI supports calls terminating at a ISDN BRI terminal. This feature is activated when a call terminating at a DSL encounters a busy condition and if hunting is enabled. You can configure internal and external hunt DN's when configuring the DSL.

A busy condition occurs when:

- the maximum number of calls on a DSL exceeds the specified limit of simultaneous calls on a DSL as defined for MCAL in LD 27, or
- if the total number of calls including active, calls held, calls waiting, and calls in progress exceed the number of channels configured to handle the incoming call type

If the call limit on a DSL is not exceeded, an incoming call will be presented to the DSL interface as a call waiting call.

Hunting is enabled or disabled when configuring the TSP for the ISDN BRI terminal DN by using Service Change BRI Program LD 27. Refer to the *ISDN BRI line and packet data implementation* chapter of this guide in *TSP configuration procedures*.

To perform a hunting test:

1 Set the FEAT parameter to HTA to enable hunting for two voice ISDN BRI terminals.

Specify this parameter when configuring the TSP by using Service Change BRI Program LD 27. Refer to the *ISDN BRI line and packet data implementation* chapter of this guide in *TSP configuration procedures*.

2 Specify the HUNT parameter DNs when configuring the DSL by using Service Change BRI Program LD 27.

These hunt parameter DNs specify the members of a hunting chain. Refer to the *ISDN BRI line and packet data implementation* chapter of this guide in *DSL configuration procedures*.

3 Place two calls, one for each voice ISDN BRI terminal, on a DSL to create a DSL busy condition.

4 Place a voice call to one of the busy ISDN BRI terminals with enabled hunting.

Since the channel type required to handle the incoming call type is busy, hunting will be automatically invoked to find an idle DN in the hunting chain.

5 If in the process of hunting the call finds an idle voice ISDN BRI or non-ISDN terminal, it will ring that terminal.

6 If hunting is not successful:

- the call originating ISDN BRI terminal should receive a busy tone if the total number of calls on the DSL exceeds the maximum number of calls allowed,
- or
- the call is placed in call waiting if the maximum number of calls on the DSL is below the specified limit

7 If the call is placed in call waiting, observe the call waiting lamp on the called ISDN BRI terminal.

The lamp should flash indicating that a call is waiting.

8 Place the active call on hold and answer the incoming call that is waiting.

9 Complete the incoming call and hang up.

10 Retrieve the call on hold.

11 Release the call connection.

Circuit-switched data calls

A circuit-switched data call can be established between two data terminals over a B-channel. The call is set up the same way as a voice call. You can dial a call using the ISDN BRI terminal key pad or keyboard depending on the type of ISDN BRI terminal used. After the connection is established and the called ISDN BRI terminal sends an acknowledgment that it is ready to receive data, the call originating ISDN BRI terminal can start transmitting user data.

If the call originating ISDN BRI terminal requests access to data stored in another ISDN BRI or non-ISDN terminal, it may have to provide a password to be able to access that data.

Note: Follow the instructions in the ISDN BRI terminal user manual for a detailed description of how to set up a call connection and how to transmit and receive data.

In general, data terminals are divided into:

- intelligent terminals such as personal computers
- dumb terminals such as video display terminals

An intelligent terminal can transmit files of information that are stored in its memory or receive and store files of information from another data terminal. A dumb terminal cannot store the information and a user has to type the information on the terminal's keyboard as it is being transmitted to another terminal. A dumb terminal can only display or print the information received from a terminal, it cannot store it.

To perform a circuit-switched data call test:

- 1 From a ISDN BRI data terminal, dial another ISDN BRI data terminal and establish an active call connection.**
- 2 After you receive an acknowledgment that the other terminal is ready, you can start transmitting data.**
- 3 Verify that the transmitted data has been received successfully by checking transmitted information for accuracy.**

You can read the information on the screen or print it on the local printer.

- 4 Release the connection.**

You may wish to repeat this test on several terminals including both intelligent and dumb terminals.

Packet data transmission

A packet data call can be established between two data terminals over a B-channel or a D-channel.

B-channel packet data terminals communicate with the external packet handler at 64 kbps over dedicated ISDN PRI B-channels. The external packet handler processes the data and distributes it to local terminals for local calls or over the packet data network for remote calls.

D-channel packet data terminals communicate at the baud rate of up to 9.6 kbps. The packet data is multiplexed onto a 64 kbps B_D-channel that is linked through a dedicated ISDN PRI B-channel with the external packet handler. The packet handler processes the data and distributes it to local terminals for local calls or over the packet data network for remote calls.

Note: To perform packet data transmission verification, the system must be connected to a packet handler and packet data transmission functions must be selected when configuring the B-channel and D-channel transmission characteristics using Service Change BRI Program LD 27. To specify this feature, refer to the *ISDN BRI line and packet data implementation* chapter of this guide in MISP configuration procedures.

In addition to configuring the MISP and the DSL using Service Change BRI Program LD 27, you must make sure that:

- the ISDN PRI loop to carry packet data has been configured using Configuration Record Program LD 17
- the packet handler route is specified by using Trunk Route Administration Program LD 16
- a PRI channel for the packet handler route has been configured using Trunk Administration Program LD 14

Refer to the *ISDN BRI line and packet data implementation* chapter in this guide for a detailed description of how to configure relevant ISDN BRI packet data transmission parameters using LD 17, LD 16, and LD 14 programs.

To perform a B-channel packet data transmission test:

- 1 From a ISDN BRI B-channel packet data terminal, dial another local or a remote ISDN BRI packet data terminal and establish an active call connection.**
- 2 After the call originating ISDN BRI terminal receives an acknowledgment message that the receiving ISDN BRI terminal is ready, the call originating ISDN BRI terminal can start transmitting packet data.**
- 3 Verify that the transmitted data has been received successfully by checking transmitted information for accuracy.**

You can read the information on the screen or print it on the local printer.

- 4 Perform this test between two ISDN BRI terminals on the Option 11 for local transmission and between an Option 11 ISDN BRI terminal and a remote ISDN BRI terminal over the network.**
- 5 Release the connection.**

You may wish to repeat the above test on several ISDN BRI packet data terminals.

To perform a D-channel packet data transmission test:

- 1 From an ISDN BRI D-channel packet data terminal, dial another ISDN BRI packet data terminal and establish an active call connection.**
- 2 After the call originating ISDN BRI terminal receives an acknowledgment that the receiving ISDN BRI terminal is ready, the call originating ISDN BRI terminal can start transmitting packet data.**
- 3 Verify that the transmitted data has been received successfully by checking transmitted information for accuracy.**

You can read the information on the screen or print it on the local printer.

- 4 Perform this test between two ISDN BRI terminals on Option 11 for local transmission and between an Option 11 ISDN BRI terminal and a remote ISDN BRI terminal over the network.**
- 5 Release the connection.**

Testing ISDN BRI trunk connectivity

Perform the following procedure to test an ISDN BRI trunk DSL.

- 1 Set up the ISDN trunk test configuration to be used, as described previously in this chapter.**
- 2 Place a call across the ISDN BRI trunk.**
- 3 Complete the call and hang up.**

Removing the test setup

After acceptance testing has been completed and the results show that the system is operating correctly, you should remove ISDN BRI terminals set up to conduct the testing and configure ISDN BRI equipment according to the customer configuration.

If you used the actual customer configuration to perform these tests, you do not have to change or remove the set-up.